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COUNTRY REPORT – AUSTRALIA

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Introduction

Forest area

Australia has approximately 156 million hectares of natural forest and woodland. About 80% of the forested area is dominated by the genus *Eucalyptus* (over 600 species). The major dominant species in the remaining forest area are *Callitris*, *Acacia* and many tropical, subtropical and temperate rainforest species. The ratio of public to private forest ownership in Australia is approximately 70:30, although significant areas of public forest are managed by private companies under leasehold agreements.

In addition to the natural forests, over 1.5 million hectares of forest plantations have been established for intensive management. Some 70% of this area has been planted with *Pinus* species, mainly *P. radiata* in the southern States, *P. elliotii* and *P. caribaea* in the north and *P. pinaster* in the west. In recent years there has been increased planting of *Eucalyptus* species for pulpwood and solid wood products. Other plantation species include *Araucaria*, *Acacia* and *Populus*.

Policy and management objectives

Australia's forests are managed in accordance with the National Forest Policy Statement signed by the Commonwealth and all State Governments in 1992. This document contains specific national objectives and policies for many forest uses including conservation, wood production, water management and tourism. Ecologically sustainable management of Australia's forests is the overriding national objective.

In all States, the public forests are managed for both conservation and wood production with a significant proportion in secure reserves where no logging is permitted. Private forests, although occupying a lower proportion of the total forest area, contain significant timber resources and are the specific habitat for many important plants and animals. Plantation forests on both public and private land are providing an ever increasing proportion of Australia's total wood production output.

Major forest health problems

Insects

There are many damaging insect pest of eucalypts, both in natural forests and plantations. The most serious defoliators include chrysomelid leaf beetles, scarab beetles and gum moths, particularly the autumn gum moth (*Mnesampela privata*). Several species of psyllids frequently cause defoliation and dieback over large areas

of eucalypt forest in several States. Wood-boring insects including termites, wood moths (*Endoxyla* spp.) and longicorn beetles (Cerambycidae) are responsible for enormous damage and timber loss in natural forests and are becoming increasingly important pests of plantation eucalypts.

In Australia's *Pinus* plantations, the major pest is the sirex woodwasp (*Sirex noctilio*) and there have been some spectacular outbreaks in which several million trees have been killed. Occasional outbreaks of the fivespined bark beetle, *Ips grandicollis*, have also caused significant local damage in *Pinus* plantations.

In tropical and subtropical rainforests, the cedar shoot caterpillar (*Hypsipyla robusta*) is a major pest of red cedar, *Toona ciliata*, and to-date has prevented the culture of this very valuable timber species.

Diseases

Root rots caused by *Phytophthora cinnamomi* and *Armillaria luteobubalina* are the most significant diseases of native forests, but cause little problem in either eucalypt or pine plantations. Defoliation and shoot dieback by leaf-infecting fungi can cause significant damage to eucalypts in native forests and plantations. *Mycosphaerella* spp. and *Aulographina eucalypti* are the most significant leaf and shoot infecting pathogens in temperate areas, while *Quambalaria pitereka* and *Cylindrocladium* spp. are significant in tropical and sub-tropical areas.

Fungal stem decays (several species) cause substantial losses in sawlog yields from native eucalypt forests. Decay is also prevalent in eucalypt plantations in the more productive high rainfall areas.

In *Pinus* plantations the major diseases are Dothistroma needle blight (*D. septospora*) and Spring needle cast (associated with *Cyclaneusma minus* and *Strasseria geniculata*). *Sphaeropsis sapinea* can cause significant shoot blight in hail-damaged or drought-affected plantations.

Abiotic factors

Fire, drought and frost are common causes of forest health problems and can have major local impacts.

Resources available for forest protection

Several Australian States have forest health surveillance programs using specialised staff to survey important forest areas as part of normal forest management practices. These surveillance staff are supported by research specialists in entomology, pathology, soils, nutrition and silviculture.

In addition to this regular health surveillance there are some pest management programs for individual pests such as the eucalypt leaf beetles.

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) has several research staff with expertise relevant to forest health and also houses the Australian national Insect Collection (ANIC). All States also have laboratories and reference collections.

Current forest health surveillance activities

Surveys

Annual health surveillance (aerial and ground inspections) of all State-owned plantations (pine and eucalypt) is conducted in Queensland, NSW and Tasmania. Surveillance activity in privately owned plantations is limited to a small number of large industrial plantation owners, using either company employees or by contracting health survey units from State forest agencies.

There is no regular surveillance of native forests in most States. Extensive annual surveys to determine areas affected by *Phytophthora cinnamomi* and *Armillaria* are conducted in Western Australia.

General surveillance of high risk port environs is not routinely done in Australia. However, Queensland and Tasmania, in collaboration with AFFA (Department of Agriculture, Fisheries and Forestry - Australia), have been involved in the development and evaluation of prototype port surveillance methods for forest species. Annual surveys (using pheromone lures) in port environs for Asian Gypsy Moth have been done in all Australian States since 1996.

Mapping of affected areas

Most State forest management agencies and some private forestry companies maintain databases containing known locations affected by specific pests and diseases. This information is generally not publicly available. The distribution of a small number of specific pests and diseases are mapped for management purposes. The spread of Sirex wood wasp (*Sirex noctilio*) in *P. radiata* plantations is reviewed annually by the National Sirex Co-ordination Committee. The Department of Conservation and Land Management (CALM) in Western Australia and Forestry Tasmania maintain publicly available maps of areas infected with *Phytophthora cinnamomi*. State Forests of NSW and CSIRO have demonstrated the potential of remote sensing to detect and map dieback (Bell Miner dieback) in eucalypt native forests.

Quarantine measures]

Legislation and regulations

The Commonwealth quarantine legislation (Quarantine Act 1908), administered by the Australian Quarantine Inspection Service (AQIS), deals with international quarantine issues. Each State and Territory (except ACT) Government has independent quarantine legislation and regulations to deal with interstate quarantine issues. In all States and Territories, except Tasmania, Western Australia and Northern Territory, the administration of State and Commonwealth quarantine legislation is done by separate agencies.

Resources

AQIS maintain inspectors (and sniffer dogs) in all shipping terminals, airports and mail centres that receive international cargo / travellers. All States maintain some

diagnostic expertise for forest pests and pathogens. However, critical diagnoses are done by acknowledged experts either within Australia or overseas. The Australian National Insect Collection is the main repository for forest insect pests although most State forest agencies also maintain large collections. There is no National collection for forest pathogens although NSW Department of Agriculture and Victorian and Queensland Departments of Primary Industries do maintain national collections that include many forest pathogens.

Interceptions of serious pests and diseases

Most of the effort of international cargo inspection at Australian ports concentrates on insect pests with little effort devoted to pathogens. As a result the number of interceptions of insect pests far outweighs those for pathogens. In the 25 years between 1971-95, 104 species of forest / timber insect pests were intercepted and destroyed at ports of entry. A small number (17 species) of these insect pests are repeatedly intercepted. Only three forest / timber insect pest species are known to have become established in Australia between 1971-95 although one further species became established subsequently.

In the 25 years between 1971-95, nine serious forest pathogens became established in Australia.

Key references on forest health

Elliott, H.J., Ohmart, C.P. and Wylie, F.R. (1998). *Insect Pests of Australian Forests: ecology and management*

Keane, P.J.; Kile, G.A.; Podger, F.D. and Brown, B.N. (Eds) (2000). *Diseases and Pathogens of Eucalypts*. CSIRO, Melbourne. 565 pp.

Standing Committee on Forestry (2000) Responding to Incursions. A generic Incursion Management Plan for the Australian Forest Sector. Commonwealth of Australia, Canberra. 26 + 39 pp.

Speight, M.R. and Wylie, F.R. (2001). *Insect Pests in Tropical Forestry*. C.A.B.I. 350 pp.

List of established pests and diseases (maximum 30)

Species	Common name	Main hosts	Type of damage
<i>Insects</i>			
<i>Anoplognathus</i> spp.	scarab beetles	<i>Eucalyptus</i>	defoliation
<i>Cardiaspina</i> spp.	psyllids	<i>Eucalyptus</i>	sap feeders
<i>Chrysophtharta</i> and <i>Paropsis</i> spp.	leaf beetles	<i>Eucalyptus</i>	defoliation
<i>Coptotermes</i> spp.	subterranean termites	<i>Eucalyptus</i>	wood feeders
<i>Endoxyla</i> spp.	wood moths	<i>Eucalyptus</i>	borers
<i>Heteronychus arator</i>	African black beetle	<i>Eucalyptus</i> , <i>Pinus</i>	stem girdling
<i>Hypsipyra robusta</i>	cedar shoot caterpillar	<i>Toona</i> , <i>Cedrela</i> , <i>Swietenia</i> , <i>Khaya</i>	shoot borer
<i>Liparetrus</i> spp.	spring beetles	<i>Eucalyptus</i>	defoliation
<i>Mnesampela privata</i>	autumn gum moth	<i>Eucalyptus</i>	defoliation
<i>Perga</i> spp.	sawflies	<i>Eucalyptus</i>	defoliation
<i>Perthida glyphopa</i>	jarrah leafminer	<i>Eucalyptus</i>	defoliator
<i>Phaulacridium vittatum</i>	wingless grasshopper	<i>Eucalyptus</i> , <i>Pinus</i>	defoliation
<i>Phoracantha</i> spp.	longicorn beetles	<i>Eucalyptus</i>	borers
<i>Phylacteophaga eucalypti</i>	leafblister sawfly	<i>Eucalyptus</i>	defoliator
<i>Porotermes adamsoni</i>	dampwood termite	<i>Eucalyptus</i>	wood feeder
<i>Sirex noctilio</i>	sirex woodwasp	<i>Pinus</i>	tree wilt
<i>Uraba lugens</i>	gumleaf skeletoniser	<i>Eucalyptus</i>	defoliator
<i>Diseases</i>			
<i>Armillaria</i> spp.	armillaria root rot	<i>Eucalyptus</i> , <i>Pinus</i>	root rot
<i>Aulographina eucalypti</i>	leaf spot	<i>Eucalyptus</i>	defoliation
<i>Botrytis cinerea</i>	grey mold	<i>Eucalyptus</i>	seedling wilt
<i>Cyclaneusma minus</i>	cyclaneusma needle cast	<i>Pinus</i>	defoliation
<i>Cylindrocladium</i> spp.	leaf blight	<i>Eucalyptus</i>	defoliation
<i>Dothistrom pini</i>	pine needle blight	<i>Pinus</i> .	defoliation
<i>Mycosphaerella</i> spp.	leaf spots	<i>Eucalyptus</i>	defoliators
<i>Phytophthora cinnamomi</i>	cinnamon fungus	<i>Eucalyptus</i> +	root rot
<i>Quambalaria piteeaka</i> .	shoot blight	<i>Eucalyptus</i>	defoliation

<i>Sphaeropsis saphina</i>	diplodia	<i>Pinus</i>	shoot blight
<i>Vertebrates</i>			
<i>Macropus</i> spp.	wallabies, kangaroos	<i>Eucalyptus</i> , <i>Pinus</i>	defoliation
<i>Thylogale billardieri</i>	pademelon	<i>Eucalyptus</i>	defoliation
<i>Trichosurus vulpecular</i>	brush possum	<i>Eucalyptus</i> , <i>Pinus</i>	defoliation